

CLAIMS

What is claimed is:

1. A method for testing a semiconductor device, the method comprising:

measuring for a first semiconductor device a first current at a first voltage and
5 a second current at a second voltage;

identifying the functional relationship between the first and second currents;
and

comparing the functional relationship to a predetermined relationship to
determine whether the device is defective.

10 2. The method as recited in claim 1 wherein the functional relationship is a
ratio between the first and second currents.

3. The method as recited in claim 1 wherein the first semiconductor device is a
transistor.

15 4. The method as recited in claim 1 wherein the first semiconductor device is
an integrated circuit.

5. The method as recited in claim 1 wherein the predetermined relationship is
determined by evaluating the functional relationship for at least one other die on the
same wafer.

20 6. The method as recited in claim 1 wherein the predetermined relationship is
determined from a plurality of dies fabricated previously.

7. The method as recited in claim 1 further comprising measuring a third
current at a third voltage and wherein identifying the functional relationship
comprises identifying the functional relationships between the first, second , and third
currents.

25 8. The method as recited in claim 1 wherein the first and second currents are
quiescent currents.

9. The method as recited in claim 1 wherein the device is determined to be defective if it deviates from the predetermined relationship by a predetermined threshold.

10. The method as recited in claim 9 wherein the functional relationship is a ratio of the first and second currents and the predetermined threshold is about 20 % of the value determined for the ratio.
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11. The method as recited in claim 1 wherein the first and second voltages are set within the range from 50 to 140 % of a nominal supply voltage for the device.

12. The method as recited in claim 1 wherein the first and second voltages are
10 set within the range from 60 to 120 % of a nominal supply voltage for the device.

13. The method as recited in claim 1 wherein the first and second voltages are supplied by automated test equipment.

14. The method as recited in claim 1 wherein the first and second currents are measured by automated test equipment.

15 15. The method as recited in claim 1 wherein the predetermined relationship comprises a running average of the functional relationship for the devices previously tested.

16. A method for testing a semiconductor die, the method comprising:

measuring for the semiconductor die at least two quiescent currents, the first current of the two quiescent currents measured when a first supply voltage is applied to a supply terminal of the die and the second current measured when a second supply voltage is applied to the supply terminal of the die;
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determining a measured ratio between the first and second currents;

comparing the measured ratio with an expected ratio for quiescent currents;

25 and

determining if the die is defective when the measured ratio differs from the expected ratio by a predetermined threshold.

17. The method as recited in claim 16 wherein the first and second voltages are supplied by automated test equipment

18. The method as recited in claim 16 wherein the first and second voltages are set within the range from 50 to 140 % of a nominal supply voltage for the device.

5 19. The method as recited in claim 16 further comprising measuring a third quiescent current at a third voltage and determining a measured ratio between the first and third currents, and the second and third currents;

 comparing the measured ratios for the first and third currents and second and third currents with corresponding expected ratios for quiescent currents; and

10 determining if the die is defective when any of the measured ratios differs from the corresponding expected ratios by a predetermined threshold.